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IS 13931-1 (1993): Automotive vehicles - Stoplight switches, Part 1: Specification [TED 11: Automotive Electrical Equipment]

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IS 13931 (Part 1) : 1993

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स्वचल वाहन — बत्ती बन्द करने के लिए स्विच

भाग 1 विशिष्ट

Indian Standard

AUTOMOTIVE VEHICLES — STOPLIGHT SWITCHES

PART 1 SPECIFICATION

UDC 629·113·066 : 621·316·5·42

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1993

Price Group 2

Automotive Electrical Equipment Sectional Committee, TED 11

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Transport Engineering Division Council.

This is one in the series of Indian Standards for controls switches used by automotives in various electrical circuits. The requirements for hydraulically operated switches are covered in IS 4373 : 1967.

This Indian Standard is based on the current practices followed by the Indian industry. It is an important adjunct to Part 2 Test methods IS 13931 (Part 2) : 1993. Stoplight switches are highly related to safety and hence shall be designed for maximum reliability. These switches are also to endure abuses as well as inadvertent wrong usage. These switches along with the stoplamps form an integral part for the overall safety of the vehicles in prevention of accidents to the vehicle and its occupants.

For the purpose of deciding whether a particular requirement of this standards is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

AUTOMOTIVE VEHICLES — STOPLIGHT SWITCHES

PART 1 SPECIFICATION

1 SCOPE

This standard specifies the requirements of mechanically operated stoplight switches used in automotive vehicles operated either on 12 V or 24 V system. This standard is not applicable to two wheelers and their three wheeled derivatives.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
13931 (Part 2) : 1993	Automotive vehicles — mechanical stoplight switches — Methods of test
10250 : 1982	Specification for severities for environmental tests for automotive electrical equipment

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definitions shall apply.

3.2 Stoplight

A brake operated lighting device which emits red light at the rear of a vehicle intended to give warning of the slowing down or the stopping of the vehicle.

3.3 Ratings

The voltage and the current range at which the switch is designed to operate satisfactorily.

3.4 Rated Voltage

The operating voltage specified by the manufacturer at which the switch is designed to operate satisfactorily.

3.5 Rated Current

The maximum current specified by the manufacturer for each terminal or pair of terminals at which the switch is designed to operate satisfactorily.

3.6 Type Tests

Tests carried out to prove conformity with specification. These are intended to prove the general qualities and design of a given type of switch.

3.7 Acceptance Tests

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

3.7.1 *Lot*

Switches of the same type, design and rating manufactured by the same factory during the same period, using the same process and materials, offered for inspection at a time shall constitute a lot.

3.8 Routine Tests

Tests carried out on each switch to check requirements which are likely to vary during production.

4 MATERIALS, CONSTRUCTION AND WORKMANSHIP

4.1 Materials

All the materials used are to be suitable for use at extreme of temperatures and other environmental conditions normally encountered on vehicles. Besides, these materials shall have good moisture resistance all over and shall be free from flaws and surface defects.

4.1.1 *Construction*

The switch shall be worked by linkages with the brake unit. When stroke of the push rod is in the designated range, electric circuit shall become 'ON' (stoplamp switched on) and when stroke is out of the range, electric circuit shall become 'OFF' (stop lamps go out).

4.1.2 *Workmanship*

The switch shall be so designed and constructed that it is mechanically sound to withstand vibrations, shocks and heat as experienced on production and usage of vehicles. The components shall be rigidly fixed so as to avoid such defects that may affect their operation or acceptance. All metallic parts exposed to atmospheric conditions shall be adequately protected to prevent corrosion and rusting.

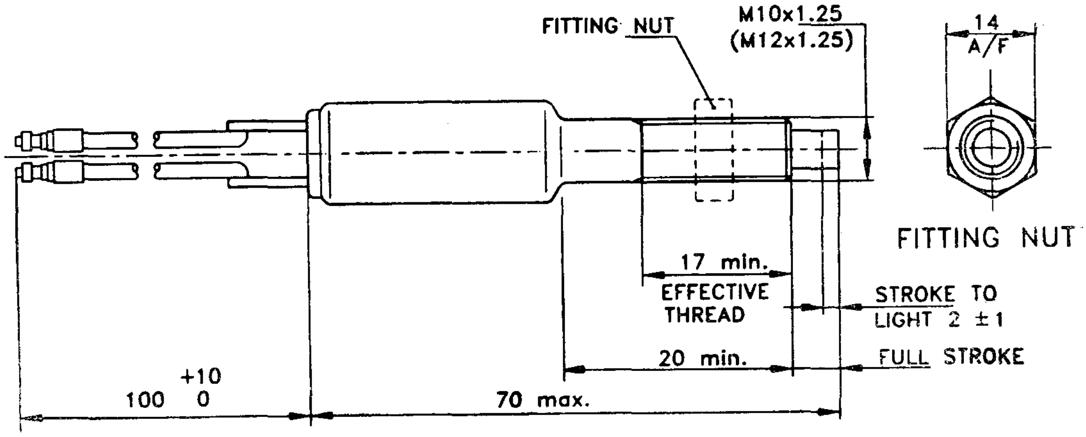
5 SHAPE AND DIMENSIONS

5.1 A typical mechanical stoplight switch is given in Fig. 1. Any other shape or dimensions may be as agreed between the manufacturer and the purchaser.

d) Endurance test

e) Vibration test

f) Environmental tests
    i) Cold
    ii) Low temperature
    iii) Dry heat
    iv) Damp heat



All dimensions in millimetres.

Fig. 1 Typical Illustration of a Mechanical Stopswitch

6 RATINGS

6.1 Rated Voltage

The rated voltage shall be either 12 V or 24 V dc.

6.2 Rated Current

Ten amps or as specified by the manufacturer and agreed by the purchasers.

7 TESTS

7.1 Classification of Tests

7.1.1 *Type Tests*

The following shall constitute type tests:

a) Visual test

b) Performance test
    i) Operating force
    ii) Working stroke

c) Static load test
    i) Mechanical strength
    ii) Strength of terminals
    iii) Terminal actuator
    iv) Drop (free fall)

    v) Water spray
    vi) Salt spray
    vii) Dust
    viii) Contamination
    ix) Corrosion resistance

g) Insulation resistance test (for metallic switches

h) High voltage test

j) Voltage drop test

k) High current test

m) Continues operation test

n) Driving rain test

7.1.2 *Acceptance Tests*

The acceptance tests shall constitute the following:

a) Visual examination

b) Dimensions

c) Performance test

d) Insulation resistance test

e) Voltage drop test

7.1.3 *Routine Tests*

The following shall constitute routine tests:

a) Visual examination

b) Dimensions

c) Performance test

d) Insulation resistance test (only for metallic switches)

7.2 Sampling

7.2.1 *Criteria for Approval*

Ten samples of stoplight switches shall comply with requirements of tests given in **4.1.1** of IS 13931 (Part 2) : 1993.

7.2.1.1 In case of failure of one or more type tests, the testing authority may call for fresh samples not exceeding twice the number of earlier samples and subject them to the test in which failure occurred. If in repeated test, no failure occurs, the test may be considered to have been satisfactory.

7.3 Visual Examination

The switches shall be examined for finish and proper assembly and shall be free from injurious flaws or other defects.

7.4 Dimensions

The switches shall be checked for dimensional requirements as per mutual agreement between the purchasers and the suppliers.

7.5 Performance Test

7.5.1 The switches shall comply with **4.4.1** and **4.4.2** of IS 13931 (Part 2) : 1993 for operating force and working stroke of switches.

7.6 Test for Voltage Drop

The voltage drop between the terminals after the test carried out in accordance with **4.5** of IS 13931 (Part 2) : 1993 with rated load shall not exceed 80 mV before the endurance test and 120 mV after the endurance test.

7.7 Insulation Resistance Test

The insulation resistance of the switches tested as per **4.6** of IS 13931 (Part 2) : 1993, when a 500 volts dc is applied at normal atmospheric conditions, shall not be less than one megohm.

7.8 High Voltage (Flash) Test

The stoplight switch tested in accordance with **4.7** of IS 13931 (Part 2) : 1993 shall withstand the test without arcing or puncture of the dielectric material.

7.9 Static Load Tests

7.9.1 *Test for Mechanical Strength*

The switches tested in accordance with **4.8.1** of IS 13931 (Part 2) : 1993 shall not show any failure and the voltage drop shall also not exceed 80 mV.

7.9.2 *Strength of Terminals*

The switches when tested as per **4.9** of IS 13931 (Part 2) : 1993 shall be capable of withstanding a static load of 50 N for one minute.

7.10 Terminal Actuator Test

After testing in accordance with **4.10** of IS 13931 (Part 2) : 1993 the terminals shall not have any deformation and play at the fixing points. The stoplight switch shall also meet performance requirements and voltage drop.

7.11 Drop (Free Fall) Test

After the test conducted in accordance with **4.11** of IS 13931 (Part 2) : 1993, there shall be no physical damage or deformation in the stoplight switch. The switch also shall meet the requirements of voltage drop and performance tests.

7.12 Endurance Test

After being tested as per **4.12** of IS 13931 (Part 2) : 1993 the switches shall meet the requirements of performance test as per **7.4.1.** The voltage drop shall not exceed 120 mV. There shall not be excessive play and the plunger movement shall be free.

7.13 Vibration Test

When tested as per **4.13** of IS 13931 (Part 2) : 1993 and subsequently tested for voltage drop, the switches shall not show a voltage drop exceeding 80 mV.

7.14 Test for Water Spray

After testing as per **4.14** of IS 13931 (Part 2) : 1993 the switches shall satisfy voltage drop not exceeding 80 mV and insulation resistance not less than one megohm.

7.15 Test for Salt Spray

The test for salt spray of mechanical stoplight switch shall be conducted in accordance with Appendix A of IS 10250 : 1982.

7.15.1 The stoplight switch, after the test, shall satisfy voltage drop not exceeding 100 mV and the insultation resistance shall not be less than one megohm.

7.16 Dry Heat Test

After testing in accordance with **4.16** of IS 13931 (Part 2) : 1993 the stoplight switch shall be free of for any crack or distortion of shape. The voltage drop shall also not exceed 80 mV.

7.17 Damp Heat Test

After the test conducted in accordance with **4.17** of IS 13931 (Part 2) : 1993 the stoplight switch shall meet the performance requirements and voltage drop not exceeding 80 mV.

7.18 Dust Test

After the test conducted according to **4.18** of IS 13931 (Part 2) : 1993 the switch shall meet the performance and voltage drop requirements.

7.19 Cold Test

The switch after testing in accordance with **4.4** of IS 10250 : 1982 shall comply with a voltage drop not exceeding 80 mV and shall not show any crack or distortion of shape.

7.19.1 *Low Temperature Test*

When agreed between the purchaser and the supplier this test shall be conducted under the following conditions:

Temperature	$-30^\circ C \pm 3^\circ C$
Duration	2 hours

The switch after the test shall not show any distortion or change of shape and also comply with a voltage drop not exceeding 80 mV.

7.20 Contamination Resistance Test

After the test conducted in accordance with **4.9** of IS 10250 : 1982, the stoplight switch shall neither react with nor dissolve in the contaminants.

7.21 Corrosion Resistance Test

After the test conducted according to **4.8** of IS 10250 : 1982 the switch shall not show any sign of corrosion and shall meet the requirements of tests for voltage drop and performance.

7.22 High Current Test

The switch after testing in accordance with **4.22** of IS 13931 (Part 2) : 1993 shall not show any sign of failure. After the test, the voltage drop shall also not exceed 80 mV.

7.23 Continuous Operation Test

7.23.1 After the test as per **4.23** of IS 13931 (Part 2) : 1993 the switch shall satisfy the performance requirements as per **7.4.1** and the voltage drop shall also not exceed 80 mV.

7.24 Driving Rain Test

After completion of test in accordance with **4.24** of IS 13931 (Part 2) : 1993 the stoplight switch shall work satisfactorily and also pass the performance and voltage drop tests.

8 PACKING

Stoplight switch shall be packed in cartons and preferably wrapped in oil paper to prevent any corrosion or dust ingress.

9 MARKING

9.1 Each stoplight switch shall be distinctly and indelibly marked with the following information:

a) Name and/or trade-mark of manufacturer

b) Terminal identification marking

c) Month and year of manufacture

9.2 Any other markings agreed between supplier and purchaser may also be followed.

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